AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) An apparatus to estimate the direction to a disturbance source in a power system, the apparatus comprising:

> a voltage transducer which is coupleable to the power system and produces a signal representative of a voltage in the power system;

> a current transducer which is coupleable to the power system and produces a signal representative of a current flowing within the power system, the signal having a forward reference direction and a behind reference direction corresponding to the current flow; and

> disturbance ~~energy~~ determination circuitry ~~coupled to~~ <u>in communication with</u> the voltage transducer and the current transducer, the circuitry determining a measure of disturbance <u>power and</u> energy ~~and~~ <u>for use in</u> estimating a direction of disturbance ~~energy flow~~ with respect to the system as either in front of or behind the disturbance locating apparatus.

2. (Canceled)

3.   (Currently Amended) The apparatus of claim [[2]] 1, wherein
      the disturbance ~~power~~ determination circuitry further
      comprises:

      a computer readable storage medium operative to store a
         program, the program comprising an instruction code;
         and

      a processor ~~coupled to~~ <u>in communication with</u> the storage
      medium and operative to perform a processing function
      based upon the instruction code.

4.   (Currently Amended) The apparatus of claim [[2]] 1, wherein
      the disturbance ~~power~~ determination circuitry comprises
      dedicated circuitry.

5.   (Original) The apparatus of claim 1, wherein the voltage
      transducer is coupled via a voltage transformer to the
      power system.

6.   (Original) The apparatus of claim 1, wherein the current
      transducer is coupled via a current transformer to the
      power system.

7.-16. (Canceled)

17.   (Currently Amended) For use in estimating the direction to
      a disturbance source in a power system, an apparatus
      comprising:

a voltage transducer coupleable to the power system and operative to produce a first signal representative of a voltage within the power system;

a current transducer coupleable to the power system and operative to produce a second signal representative of a current within the power system; and

a logic circuit ~~coupled to~~ <u>in communication with</u> the voltage transducer and the current transducer, the logic circuit being operative to calculate a disturbance quantity based upon the first and second signals, the logic circuit using the disturbance quantity to estimate the direction to the disturbance source<u>, wherein the disturbance quantity comprises a measure of an initial peak of a disturbance power signal</u>.

18.-20. (Canceled)

21. (Currently Amended) ~~The apparatus of claim 17, wherein the disturbance quantity comprises a measure of an initial peak of disturbance energy signal.~~ For use in estimating the direction to a disturbance source in a power system, an apparatus comprising:

a voltage transducer coupleable to the power system and operative to produce a first signal representative of a voltage within the power system;

a current transducer coupleable to the power system and operative to produce a second signal representative of a current within the power system; and

a logic circuit ~~coupled to~~ in communication with the voltage transducer and the current transducer, the logic circuit being operative to calculate a disturbance quantity based upon the first and second signals, the logic circuit using the disturbance quantity to estimate the direction to the disturbance source, wherein the disturbance quantity comprises a measure of an initial peak of a disturbance energy signal.

22. (Original) The apparatus of claim 17, wherein the estimate of the direction indicates one of a forward direction and a behind direction with respect to the apparatus, and the estimate of the direction is derived from the polarity of the disturbance quantity.

23. (Original) The apparatus of claim [[19]] 17, wherein the estimate of the direction indicates one of a forward direction and a behind direction, and the estimate of the direction is derived from the polarity of the initial peak of the disturbance power signal.

24. (Canceled)

25. (Original) The apparatus of claim 21, wherein the estimate of the direction indicates one of a forward direction and a behind direction, and the estimate is derived from the polarity of the initial peak of the disturbance energy signal.

26. (Original) The apparatus of claim 17, wherein the logic circuit further comprises:

a computer readable storage medium operative to store a program, the program comprising an instruction code; and

a processor ~~coupled to~~ in communication with the storage medium and operative to perform a processing function based upon the instruction code.

27. (Currently Amended) In a power grid a method for estimating a relative direction from a monitoring location on a line to a source of a disturbance, the method comprising:

monitoring a current flowing through the line in the power grid at the monitoring location;

monitoring a voltage on the line in the power grid at the monitoring location,

determining a disturbance power flow and a disturbance energy based upon the disturbance power flow through the line; and

based on the disturbance power flow and the disturbance energy through the line, estimating a relative direction to the source of the disturbance from the monitoring location.

28. (Currently Amended) The method of claim 27, wherein estimating the relative direction to the source of the disturbance from the monitoring location ~~is based upon~~ includes using the polarity and magnitude of the initial peak of the disturbance power.

29.   (Canceled)

30.   (Currently Amended) The method of claim [[29]] 27, wherein
      the final value of the disturbance energy is compared to
      the peak excursion of the disturbance energy.

31.   (Original) The method of claim 30, wherein the estimate of
      the relative direction to the source of the disturbance
      from the monitoring location is based upon the polarity of
      the final value of the disturbance energy.

32.   (Currently Amended) The method according to Claim [[29]]
      27, wherein:
          the estimate of relative direction to the source of the
              disturbance from the monitoring location is based upon
              includes using the polarity of the final value of the
              disturbance energy if final value of the disturbance
              energy is at least about 0.8 multiplied by the peak
              excursion of the disturbance energy; and
          the estimate of relative direction to the source of the
              disturbance from the monitoring location is based upon
              includes using the polarity of the initial peak of the
              disturbance energy if final value of the disturbance
              energy is not at least about 0.8 multiplied by the
              peak excursion of the disturbance energy.

33.-35. (Canceled)

36.   (New) In a power grid a method for estimating a relative
       direction from a monitoring location on a line to a source
       of a disturbance, the method comprising:

    monitoring a current flowing through the line in the
      power grid at the monitoring location;

    monitoring a voltage on the line in the power grid at the
      monitoring location,

    determining a disturbance power flow and a disturbance
      energy through the line; and

    based on the disturbance power flow and the disturbance
      energy through the line, estimating a relative
      direction to the source of the disturbance from the
      monitoring location, wherein the estimate of relative
      direction to the source of the disturbance from the
      monitoring location includes:

      using the polarity of the final value of the
        disturbance energy if final value of the
        disturbance energy is at least about 0.8
        multiplied by the peak excursion of the
        disturbance energy, and

      using the polarity of the initial peak of the
        disturbance energy if final value of the
        disturbance energy is not at least about 0.8
        multiplied by the peak excursion of the
        disturbance energy.